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(54) Access hatch assemblies

(57) An access hatch assembly comprises a frame part 10 defining a circular opening 14 and a cover plate 11, sealed therein by an O-ring 23, having a screw 27 therein which rotatably supports a jacking disc 31. The frame part 10 includes an inwardly directed annular shoulder 19, engaged by the jacking disc 31 on rotation of the screw 27 to raise the cover plate 11 for easy removal.

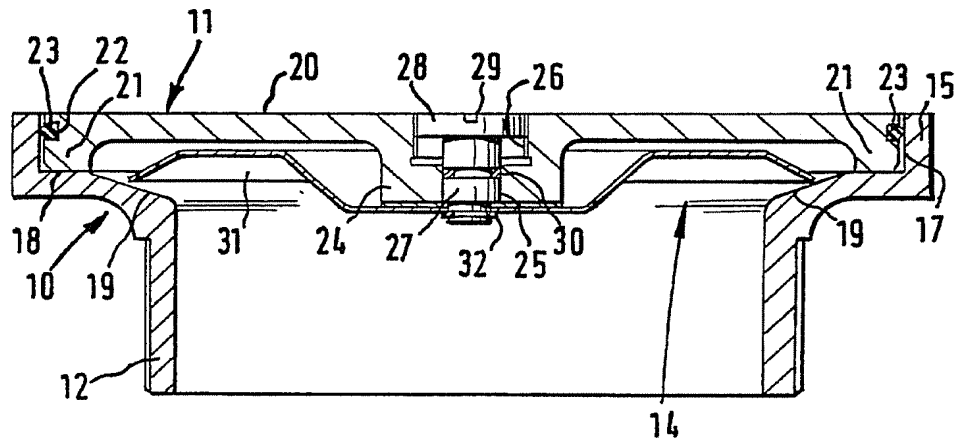


FIG. 1

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

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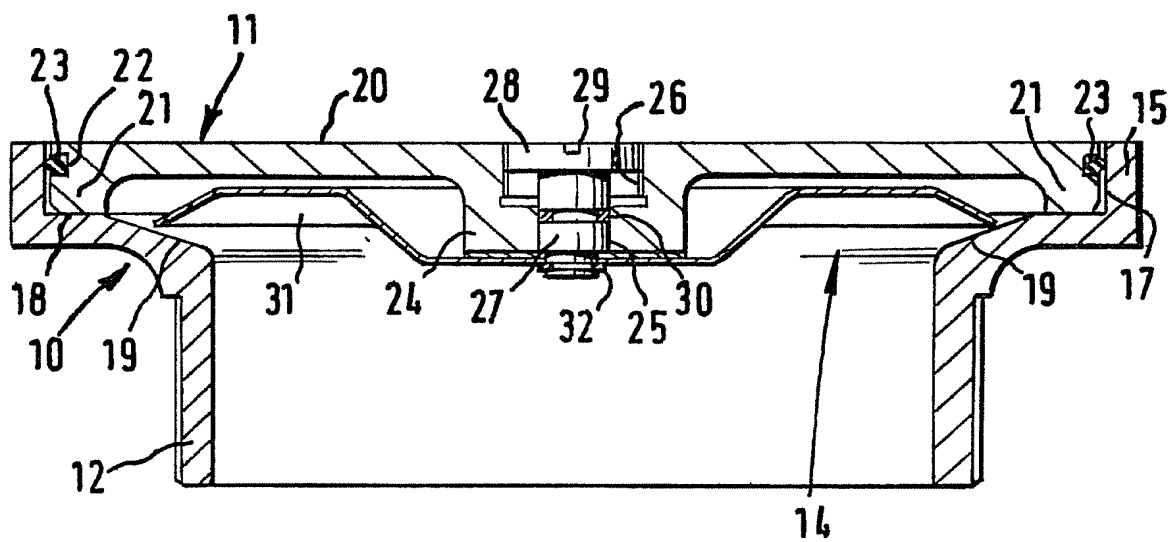


FIG.1

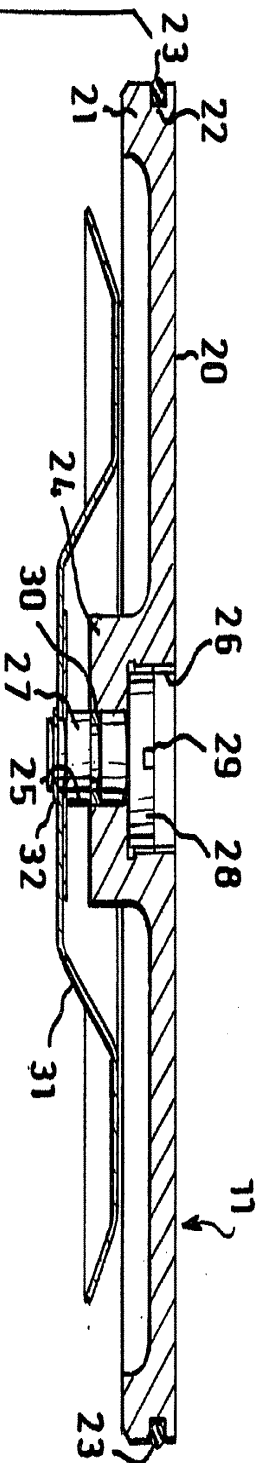
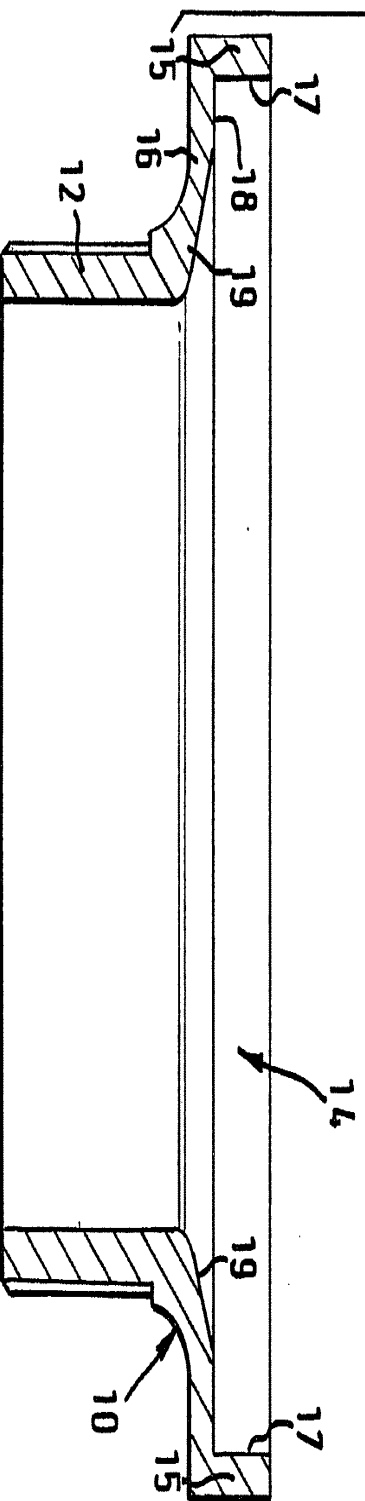
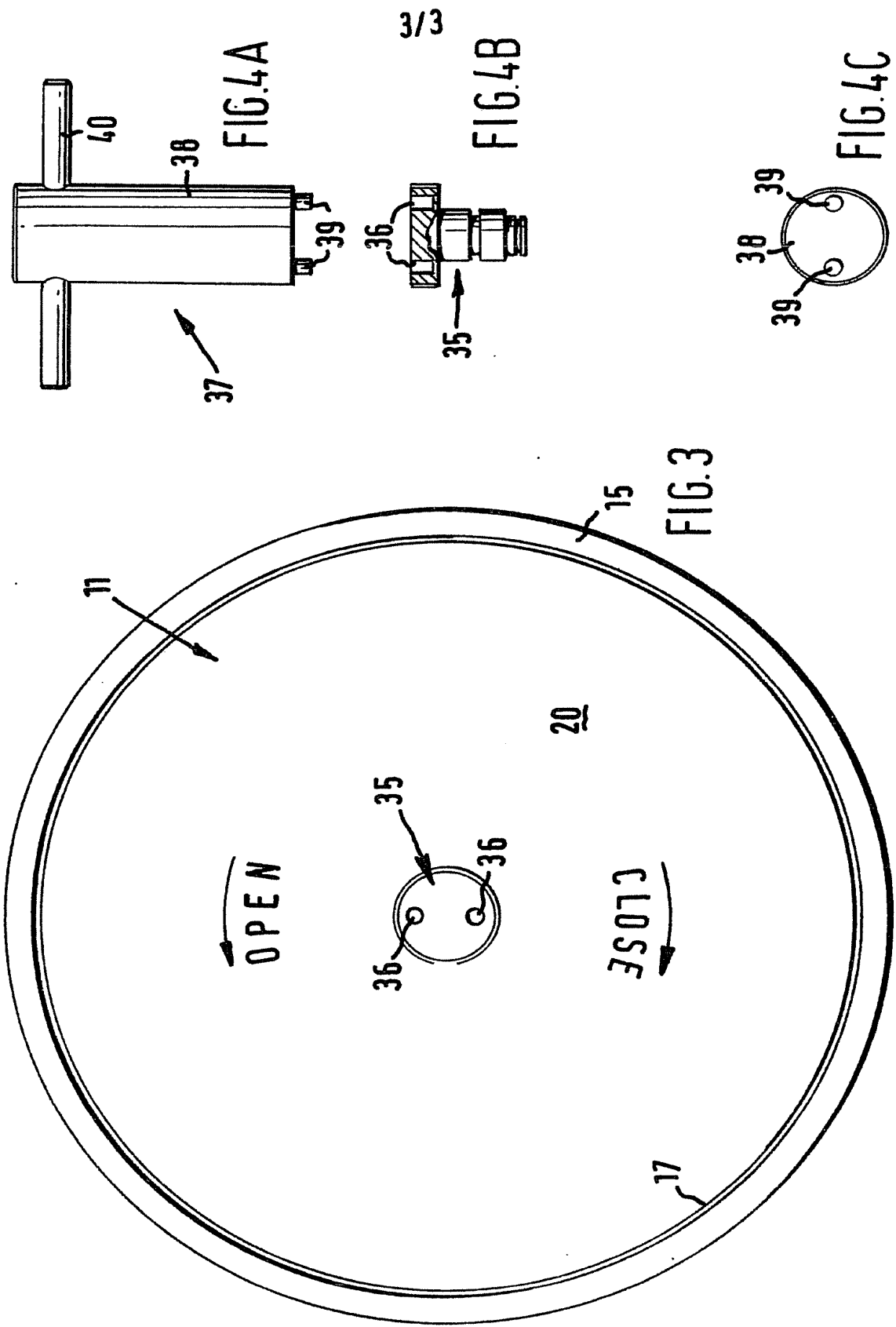


FIG. 2





SPECIFICATION

Access hatch assemblies

This invention relates to an access hatch assembly, comprising a frame part defining an opening and a cover plate which may be fitted into that opening. Such an access hatch assembly will hereinafter be referred to as an "access hatch of the kind described".

Access hatches of the kind described frequently are let into floors, and sometimes into walls or ceilings, so that access may be had to some service with which the frame part is connected or which the frame part surrounds, when the cover plate has been removed. For example, an electrical point — such as for mains electricity or telephone communications — may be provided beneath the cover plate, or the frame part may communicate with a drain, to allow waste liquid to flow away when the cover plate has been removed. Safety requirements dictate that such an access hatch when let into a floor may not have any upstanding projections, and so the upper edge of the frame part should be disposed flush with the main floor surface. Also, the top surface of the cover plate should lie in the same plane, to give an essentially flat floor surface. Moreover, especially if the floor is liable to get wet or if the frame part communicates with a drain, it may be most important that the cover plate fits sealingly in a liquid-tight manner within the frame part.

The removal of the cover plate from the frame part let into a floor may be most difficult, in view of the requirement not to have any upstanding projections which may be grasped to lift the cover plate. As a result, it is usual to provide various blind recesses, notches or other cut-out portions in the cover plate to allow the insertion of a plurality of pointed tools, whereby the cover plate may be prised out of the frame part. However, where an access hatch of the kind described is provided in a floor to give access to a drain to allow the removal of noxious or other liquid chemicals which may be spilt on the floor, it may be important that the cover plate of the access hatch is removable rapidly — and an arrangement requiring the use of special pointed tools consequently would be most disadvantageous. On the other hand, sometimes one may require the service beneath the cover plate of an access hatch of the kind described to be maintained free from interference by those not authorised to do so; the known arrangements requiring special tools such as hooked levers, screwdrivers or the like hardly afford significant security against tampering.

It is an object of this invention to provide an access hatch assembly of the kind described, in which the cover plate may be removed relatively easily, provided that the operator has a single tool of the required form — which tool may in itself be extremely simple and commonplace so that the cover plate may be removed rapidly by anyone or which tool may be specially formed so as to lend a measure of security to the access hatch.

Accordingly, this invention provides an access

hatch assembly comprising a frame part defining an opening and a cover plate which may be fitted into the opening, the frame part having an inwardly-directed shoulder spaced from the mouth of the opening such that the cover plate may be located between the mouth of the opening and the shoulder, and the cover plate having a screw threaded bore extending therethrough in which bore is threaded a screwed element carrying a jacking member at or adjacent the end of the element which ordinarily is on the inner side of the cover plate, the jacking member being so dimensioned as to lie between the cover plate and the shoulder when the cover plate is located in the opening, such that rotation of the screwed element in the correct sense drives the jacking plate on to the shoulder and then at least partially lifts the cover plate out of the opening.

It will be appreciated that in the access hatch assembly of this invention, the screwed element has to be rotated, in order to lift the cover plate to an extent sufficient to allow the cover plate to be grasped and removed wholly from the frame. Thus, the screwed element may have a simple, broad cross-slot extending diametrically across the end face of the element: such an element is of a low security kind, for it may be turned by virtually any tool or object having a flat portion which may be located in the cross-slot in the end face of the screwed element. Alternatively, the screwed element may be of a high-security kind, such that it may be rotated only by a special tool adapted to co-operate with the screwed element. For example, the screwed element may have a recess in its end face which recess has a particular form — such as a hexagonal shape or even an irregular shape, the recess being drivingly engageable by a correspondingly formed projection on the tool. Another possibility is to provide a plurality of recesses in the end face of the screw, whereby the screw may be rotated by means of a tool having a corresponding number and disposition of projections, for location in the recesses.

In the preferred arrangement of this invention, when the cover plate is fitted fully within the opening defined by the frame part, the screwed element has its end face lying in the same plane as the top surface of the cover plate. When so-positioned, the jacking member advantageously lies closely adjacent or actually in engagement with the shoulder provided within the frame part. Consequently, rotation of the screwed element in such a sense that the screwed element moves deeper into the opening defined by the frame part will then immediately — or almost immediately — start to lift the cover plate out of the opening, and once the cover plate has been lifted to a sufficient extent, it may be grasped and pulled free of the frame part.

Preferably, the shoulder within the frame part is in the form of an annular rib, whereby no specific alignment has to be effected between the jacking member and the shoulder. The jacking member may itself also be of circular shape, with a radius

greater than the radius of the inner surface of the shoulder: alternatively the jacking member may be in the form of a simple cross-bar, where the shoulder is in the form of a continuous annular rib.

- 5 The jacking member should have such a profile as to allow it to lie immediately next to the shoulder, when the screwed element has been positioned as has been described above. For a case where the screwed element is to have a considerable travel,
- 10 it may be necessary to provide a boss on the inner surface of the cover plate through which boss the screwed bore of the cover plate extends, such that the screwed element may be threaded down into the boss when the cover plate is to be removed.
- 15 This arrangement may necessitate the provision of a cranked jacking member, such that the peripheral portion thereof lies closely adjacent both the inner surface of the cover plate and the shoulder in the frame part, whilst the central
- 20 portion thereof is stepped deeper into the opening defined by the frame part whereby the threaded boss may be accommodated within such stepped central portion.

- In view of the positive lifting action provided by
- 25 the arrangement of this invention, it is feasible to provide a high quality seal between a cover plate and the frame part within which it fits. In the past, this has been difficult because the provision of such a seal usually leads to an increase in the
- 30 force required to lift the cover plate out of the frame part. Accordingly, a preferred embodiment of access hatch assembly of this invention has a cover plate of circular form and so dimensioned as to fit closely within a correspondingly-shaped
- 35 opening defined by the frame part, there being a resilient sealing member — such as an 'O'-ring — located in a groove in one of the cover plate and frame part and sealingly engageable with the other of the cover plate and the frame part.

- 40 By way of example only, one specific embodiment of this invention and a modification thereof will now be described in detail, reference being made to the accompanying drawings in which:—

- 45 Figure 1 is a vertical cross-sectional view through the access hatch assembly of this invention, with the cover plate fitted within the frame part;

- 50 Figure 2 is a view of the access hatch of Figure 1, but with the cover plate removed from the frame part;

Figure 3 is a view of the assembly of Figures 1 and 2, but with the screw thereof replaced by a security screw; and

- 55 Figures 4A, 4B and 4C respectively show an operating tool for the cover of Figure 3, the screw used in that embodiment, and an end view of the tool of Figure 4A.

- 60 Referring initially to Figures 1 and 2, the access hatch assembly of this invention comprises a frame part 10 and a cover plate 11. The frame part 10 has an externally threaded circular tubular section 12, adapted for connection by means of an appropriately threaded sleeve (not shown) to a
- 65 duct, such as a drain. The frame part 10 also

defines a circular opening 14 by means of a peripheral wall 15 connected to the tubular section 12 by means of a flanged region 16. The internal surface of the wall 15 is machined at 17 such that the wall has a smooth finish of a closely-controlled diameter, and the flanged region 16 is machined at 18 so as to provide a surface against which the cover plate 11 may seat. Between the machined surface 18 and the internal surface of the tubular section 12 there is an annular shoulder

- 70 19, of a generally outwardly flaring form.
- The cover plate 11 has a plane top surface 20, there being an annular rib 21 depending from the periphery thereof and of such a thickness that when the cover plate is located within the opening 14 (as illustrated in Figure 1), the rib 21 engages the surface 18 and the top surface of the cover plate 11 is in the same plane as the free end of the wall 15. A groove 22 is provided around the
- 80 peripheral wall of the cover plate, in which groove 22 there is positioned an 'O'-ring 23, sealingly engageable with the machined surface 17 of the frame part 10.

- The central region of the cover plate 11 has an
- 90 inwardly-directed boss 24, there being a bore 25 extending axially through the cover plate 11 and boss 24, which bore 25 has a counter-bore 26 extending into the cover plate 11 from the top surface thereof. This counter-bore 26 is internally
- 95 threaded, and there is received therein a screw 27 having an externally-threaded head 28 the threads of which co-operate with those in the counter-bore 26. The head 28 has a simple cross-slot 29 extending diametrically there-across and the plain shank of the screw 27 is provided with an annular
- 100 groove 30 in which is located an 'O'-ring to effect a seal between the screw 27 and the bore 25.

- The inner end portion of the bolt has a reduced diameter, and rotatably mounted on this end
- 105 portion is a jacking member 31, retained thereon by means of a circlip 32. The jacking member 31 is of a circular overall shape, and has such a diameter that it overlies the annular shoulder 19 provided in the frame part 10, when the cover plate has been located in the opening 14. The central portion of the jacking member has a depressed central region as shown in Figures 1 and 2, so as to allow the accommodation therein of the boss 24; the peripheral region of the jacking
- 110 member 31 is turned downwardly also as shown, so as to give the jacking member adequate strength.

- Figure 1 shows the access hatch assembly of this invention with the cover plate 11 located within the frame part 10. In this position, the top surface of the cover plate 11 and the head 28 of the screw 27 are flush with the free end of the wall 15 of the frame part 10. Thus, provided the frame part 10 has properly been let into a floor, the access hatch assembly will provide a smooth continuous surface contiguous with the floor. When however it is required to remove the cover plate 11, the screw 27 is rotated by means of a suitable tool engaged with the cross-slot 29 — for
- 120
- 125
- 130 instance, using a conventional screw-driver or

even a coin — in such a sense that the screw 27 is threaded deeper into engagement with the cover plate 11. This moves the jacking member 31 away from the cover plate 11, as shown in the top

5 portion of Figure 2, but since the peripheral region of the jacking member 31 is engaged with the shoulder 19 of the frame part 10, the cover plate 11 is lifted at least partially out of the frame part 10.

10 Conveniently, the threads in the counter-bore 26 and on the head 28 are of left-handed form; in this way, the screw 27 may be turned anti-clockwise (that is in the normal sense to effect "removal") but this will thread the screw 27

15 deeper into the cover plate boss 24, hence effecting a lifting action on the cover plate 11.

Referring now to the assembly of Figure 3, the screw 27 of the assembly of Figures 1 and 2 has been replaced by a screw 35, shown in detail in 20 Figure 4B. This screw is similar to screw 27, but has the cross-slot 29 of the latter screw replaced by a pair of recesses 36 on a common pitch circle, each recess extending parallel to the screw axis. A key such as is shown in Figures 4A and 4C must be used to rotate the screw of Figure 4B, the key 25 37 comprising a body 38 of circular cross-sectional shape and having a pair of pegs 39 projecting from one end face, on the same pitch circuit as the recesses 36. Adjacent the other end 30 of the body 38 is mounted a tommy-bar 40, extending diametrically across the body.

As shown in Figure 3, the top surface of the cover plate may carry markings to show the sense in which the screw 35 should be turned, to effect the lifting or to allow lowering of the cover plate. With markings as shown in Figure 3, the screw and threaded bore in the cover plate should have left-handed threads, such that anti-clockwise movement of the screw will cause the screw to 40 move deeper into the threaded bore, and hence lift the cover plate. Such rotational movement of the screw may be effected by means of the key of Figures 4A and 4C, positioned such that the pegs 39 engage with the recesses 36 of the bolt 45 allowing torque to be imparted thereto.

CLAIMS

1. An access hatch assembly comprising a frame part defining an opening and a cover plate for fitting into the opening, the frame part having 50 an inwardly-directed shoulder spaced from the mouth of the opening such that the cover plate may be located between the mouth of the opening and the shoulder, and the cover plate having a screw threaded bore extending therethrough in 55 which bore is threaded a screwed element carrying a jacking member at or adjacent the end of the element which ordinarily is on the inner side of the cover plate, the jacking member being so

dimensioned as to lie between the cover plate and the shoulder when the cover plate is located in the opening of the frame, such that rotation of the screwed element in the correct sense drives the jacking member on to the shoulder and then at least partially lifts the cover plate out of the 65 opening.

2. An access hatch assembly according to claim 1, wherein the screwed element has a cross-slot extending diametrically across the end face of the element to permit the rotation thereof.

70 3. An access hatch assembly according to claim 1, wherein a plurality of recesses are provided in the end face of the screwed element for engagement by a tool having a like plurality of projections configured in a corresponding 75 disposition to that of the recesses whereby the screwed element may be rotated by the tool.

4. An access hatch assembly according to any of the preceding claims, wherein the screwed element has an end face which lies in the same 80 plane as the top surface of the cover plate, when the cover plate is fitted fully within the opening defined by the frame part.

5. An access hatch assembly according to any of the preceding claims, wherein the shoulder 85 within the frame part is in the form of an annular rib.

6. An access hatch assembly according to claim 5, wherein the jacking member is of circular shape, with a radius greater than the radius of the 90 inner edge of the shoulder.

7. An access hatch assembly according to claim 5, wherein the jacking member is in the form of a cross-bar, rotatably supported by the screwed element.

95 8. An access hatch assembly according to any of the preceding claims, wherein the cover plate has a boss provided on its inner face which boss has a screw-threaded bore in which the screwed element is threadingly received.

100 9. An access hatch assembly according to claim 8, wherein the jacking member has a dished central region whereby the outer regions of the jacking member may lie closely adjacent the inner face of the cover plate with the boss received in 105 the dished central region of the jacking member.

10. An access hatch assembly according to any of the preceding claims, wherein the cover plate is of circular form and so dimensioned as to fit closely within a correspondingly-shaped opening 110 defined by the frame part, there being a resilient sealing member located in a groove in one of the cover plate and frame part and sealingly engageable with the other of the cover plate and the frame part.

115 11. An access hatch assembly according to claim 10, wherein the resilient sealing member is located in an annular groove extending around the outer cylindrical surface of the cover plate to

engage an inner cylindrical surface of the frame part.

12. An access hatch assembly according to

claim 1 and substantially as hereinbefore
5 described with reference to and as illustrated in
the accompanying drawings.

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